Listing of Claims:

Claim 1 (currently amended): A method for providing a color space representation of color images in a color management system, comprising the steps of:

mapping RGB color data values representing an image in a first device into gamut expanded sRGB color data values of a gamut expanded sRGB color space; and

converting the gamut expanded sRGB color data values of the gamut expanded sRGB color space into RGB color data values representing an image in a second device, the RGB color data values of the first device being different from the RGB color data values of the second device and the physical appearance of the image in the first device being the same as the physical appearance of the image in the second device,

wherein the step of mapping includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value, wherein ~~the R_0, G_0, B_0~~XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

$$\text{where } M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65} / y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65}) / y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to the gamut expanded sRGB color data values of the gamut expanded sRGB color space is obtained in accordance with the following:

$$M_w = M_{D65} S_w,$$

$$\text{where } M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

$$\text{where } S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein the step of converting includes converting from the gamut expanded sRGB color data values of the gamut expanded sRGB color space to XYZ values based upon a ~~traversen~~ transverse matrix obtained in accordance with the following:

$$M_w^{-1} = S_w^{-1} M_{D65}^{-1},$$

$$\text{where } M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

$$\text{where } S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X_w and Z_w denote corresponding X and Z values with respect to a standard illuminans defined by CIE,

wherein the RGB color data values representing the image in the second device are obtained in accordance with the ~~collowing~~following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

$$\text{where } M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein m denotes a rotational part, t denotes a transitional part, n denotes an inverse rotational part, and u denotes an inverse transitional part.

Claims 2-3 (canceled)

Claim 4 (previously presented): The method of claim 1 wherein if the color data values in the gamut expanded sRGB color space lie outside a range of the RGB color data values of the second device, further including clipping the color data values for the second device.

Claim 5 (canceled)

Claim 6 (previously presented): The method of claim 1 wherein the gamut expanded sRGB color space is linear in visual intensity.

Claim 7 (previously presented): The method of claim 1 wherein the gamut expanded sRGB color space comprises an XsRGB color space that includes at least the visible range of color values, and where selected, the gamut expanded sRGB color space includes an alpha channel for at least one of: transparency information and opaqueness information.

Claim 8 (previously presented): The method of claim 1 wherein the gamut expanded sRGB color space includes a color space defined by a gamut that extends into negative component values and beyond 1.0 when normalized to 1.0 in RGB.

Claims 9-10 (canceled)

Claim 11 (previously presented): The method of claim 1 wherein each color data value of the image in the first device uses a signed 16 bit integer and 13 bits are used as a decimal portion.

Claim 12 (original): The method of claim 11 wherein 16 bit components R_{16}, G_{16} and B_{16} are given by:

$$\begin{bmatrix} R_{16} \\ G_{16} \\ B_{16} \end{bmatrix} = 8192 \times \begin{bmatrix} R_0 \\ G_0 \\ B_0 \end{bmatrix}$$

where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value.

Claim 13 (previously presented): The method of claim 4, wherein mapping includes, where color data values of the first device have been represented using signed 16 bit values and 13 bits of decimal precision, clipping the 16 bit values below 0 and above 8192 to convert the 16 bit values to 8 bit values.

Claim 14 (previously presented): The method according to claim 1, wherein the color data values of the first device are one of: non-premultiplied color data values, premultiplied color data values, and normalized numerically linear premultiplied color data values.

Claim 15 (currently amended): In a digitized image processing system in which an image digitizer outputs digital signals representing an image, a method for providing representation of color images from measured RGB color data values in a color management system, comprising the steps of:

mapping the measured RGB color data values to a gamut expanded sRGB color space, wherein the gamut expanded sRGB color space includes color data values beyond a reproduction range of a specific device and includes all colors in a humanly visible gamut; and

converting the gamut expanded sRGB color data values of the gamut expanded sRGB color space into RGB color data values representing an image in a destination device, the measured RGB color data values being different from the RGB color data values of the destination device and the physical appearance of the image output by the image digitizer being the same as the physical appearance of the image in the destination device,

wherein the step of mapping includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value,

wherein ~~the R_0, G_0, B_0~~ XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

$$\text{where } M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65}/y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65})/y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to the gamut expanded sRGB color data values of the gamut expanded sRGB color space is obtained in accordance with the following:

$$M_w = M_{D65} S_w,$$

where $M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

where $S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein the step of converting includes converting from the gamut expanded sRGB color data values of the gamut expanded sRGB color space to XYZ values based upon a transverse~~traverse~~ matrix obtained in accordance with the following:

$$M_w^{-1} = S_w^{-1} M_{D65}^{-1},$$

$$\text{where } M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

$$\text{where } S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X_w and Z_w denote corresponding X and Z values with respect to a standard illuminans defined by CIE,

wherein the RGB color data values representing the image in the destination device are obtained in accordance with the following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

$$\text{where } M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein m denotes a rotational part, t denotes a transitional part, n denotes an inverse rotational part, and u denotes an inverse transitional part.

Claim 16 (previously presented): The method of claim 15 wherein the gamut expanded sRGB color space includes an XsRGB color space defined by a gamut that extends into negative component values and beyond 1.0 when normalized to 1.0 in RGB, and where selected, wherein

the expanded sRGB color space includes an alpha channel for at least one of: transparency information and opaqueness information.

Claims 17-18 (canceled)

Claim 19 (previously presented): The method of claim 15, wherein each measured RGB color data value uses a 16 bit integer and 13 bits are used as a decimal portion.

Claim 20 (previously presented): The method of claim 15, wherein 16 bit components R_{16}, G_{16}, and B_{16} of measured color data values are given by:

$$\begin{bmatrix} R_{16} \\ G_{16} \\ B_{16} \end{bmatrix} = 8192 \times \begin{bmatrix} R_0 \\ G_0 \\ B_0 \end{bmatrix}$$

where the R_0, G_0, B_0 values denote normalized numerically linear red, green and blue components for a color value.

Claim 21 (previously presented): The method of claim 15, wherein if measured RGB color data values have been represented using signed 16 bit values with 13 bits of decimal precision, further including clipping the 16 bit values below 0 and above 8192 to convert the 16 bit values to 8 bit values.

Claim 22 (previously presented): The method of claim 15, wherein the measured RGB color data values are one of: non-premultiplied color data values, premultiplied color data values, and normalized numerically linear premultiplied color data values.

Claim 23 (currently amended): A computer-readable medium having computer-executable instructions for performing the steps of:

mapping measured color data values to a gamut expanded sRGB color space, wherein the gamut expanded sRGB color space includes color data values beyond a reproduction range of a specific device and includes all colors in a humanly visible gamut; and

converting the gamut expanded sRGB color data values of the gamut expanded sRGB color space into RGB color data values representing an image in a destination device, the measured color data values being different from the RGB color data values of the destination device and the physical appearance of an image output by a digitizer device being the same as the physical appearance of the image in the destination device,

wherein the step of mapping includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value,

wherein ~~the R_0, G_0, B_0~~ XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

where $M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65}/y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65})/y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to the gamut expanded sRGB color data values of the gamut expanded sRGB color space is obtained in accordance with the following:

$M_w = M_{D65} S_w$,

where $M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

where $S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein the step of converting includes converting from the gamut expanded sRGB color data values of the gamut expanded sRGB color space to XYZ values based upon a ~~traverse~~ transverse matrix obtained in accordance with the following:

$M_w^{-1} = S_w^{-1} M_{D65}^{-1}$,

where $M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

where $S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein X_n and Z_n denote corresponding X and Z values with respect to a standard illuminans defined by CIE.

wherein the RGB color data values representing the image in the destination device are obtained in accordance with the following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

where $M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix},$

wherein m denotes a rotational part, t denotes a transitional part, n denotes an inverse rotational part, and u denotes an inverse transitional part.

Claims 24-56 (canceled)

Claim 57 (currently amended): In a digitized image processing system in which an image digitizer utilizes color image information to output RGB digital color signals representing a color image to an apparatus that uses the digital color signals to provide representation of a color image in a color management system, the apparatus comprising:

an expanded sRGB color space mapper, for mapping the digital color signals representing RGB color data values of the image digitizer to gamut expanded sRGB color space values; and

a processor for converting said gamut expanded sRGB color space values to RGB color space values representing an image in a destination peripheral device, the RGB color data values of the image digitizer being different from the RGB color data values of the destination peripheral device and the physical appearance of the image in the image digitizer being the same as the physical appearance of the image in the destination peripheral device,

wherein the expanded sRGB color space mapper for mapping includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value,

wherein ~~the R_0, G_0, B_0~~ XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

$$\text{where } M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65} / y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65}) / y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to the gamut expanded sRGB color data values is obtained in accordance with the following:

$$M_w = M_{D65} S_w,$$

$$\text{where } M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

where $S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein the step of converting includes converting from the gamut expanded sRGB color data values to XYZ values based upon a transverse~~traverse~~ matrix obtained in accordance with the following:

$M_w^{-1} = S_w^{-1} M_{D65}^{-1}$,

where $M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

where $S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein X_w and Z_w denote corresponding X and Z values with respect to a standard illuminans defined by CIE,

wherein the RGB color data values representing the image in the destination peripheral device are obtained in accordance with the following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

$$\text{where } M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$

wherein m denotes a rotational part, t denotes a transitional part, u denotes an inverse rotational part, and u denotes an inverse transitional part.

Claim 58-59 (canceled)

Claim 60 (currently amended): A method for representing color images in a color management system in a gamut expanded sRGB color space and further representing at least one of super transparent and super opaque colors using an alpha channel, comprising the steps of:

representing RGB color data values of a source peripheral device as one of perceptually visible super transparent data values and perceptually visible super opaque data values in said gamut expanded sRGB color space; and

converting one of said perceptually visible super transparent data values and perceptually visible super opaque data values to RGB color data values of a destination peripheral device, the RGB color data values of the source peripheral device being different from the RGB color data values of the destination peripheral device and the physical appearance of an image represented by the RGB color data values in the source peripheral device being the same as the physical appearance of an image represented by the RGB color date values in the destination peripheral device,

wherein the step of representing includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value,

wherein ~~the R_0, G_0, B_0~~ XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

where $M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix},$

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65}/y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65})/y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to gamut expanded sRGB color data values of the gamut expanded sRGB color space is obtained in accordance with the following:

$M_w = M_{D65} S_w,$

where $M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

$$\text{where } S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein the step of converting includes converting from the gamut expanded sRGB color data values of the gamut expanded sRGB color space to XYZ values based upon a transverse~~traverse~~ matrix obtained in accordance with the following:

$$M_w^{-1} = S_w^{-1} M_{D65}^{-1},$$

$$\text{where } M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

$$\text{where } S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X_w and Z_w denote corresponding X and Z values with respect to a standard illuminans defined by CIE,

wherein the RGB color data values representing the image in the destination peripheral device are obtained in accordance with the following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

$$\text{where } M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein m denotes a rotational part, t denotes a transitional part, n denotes an inverse rotational part, and u denotes an inverse transitional part.

Claim 61 (currently amended): A method for converting color data values comprising the steps of:

mapping color data values representing an image in a first device into color data values of a XsRGB color space; and

converting the XsRGB color data values into color data values representing an image in a second device,

wherein the step of mapping includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value,

wherein ~~the R_0, G_0, B_0~~ XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

$$\text{where } M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65}/y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65})/y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to the XsRGB color space is obtained in accordance with the following:

$$M_w = M_{D65} S_w,$$

$$\text{where } M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

$$\text{where } S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein the step of converting includes converting from the XsRGB color data values to XYZ values based upon a transverse~~traverse~~ matrix obtained in accordance with the following:

$$M_w^{-1} = S_w^{-1} M_{D65}^{-1},$$

$$\text{where } M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \text{ and,}$$

$$\text{where } S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein X_w and Z_w denote corresponding X and Z values with respect to a standard illuminans defined by CIE,

wherein the color data values representing the image in the second device are obtained in accordance with the following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

$$\text{where } M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein m denotes a rotational part, t denotes a transitional part, u denotes an inverse rotational part, and u denotes an inverse transitional part.

Claim 62 (currently amended): A computer-readable medium comprising computer readable instructions that, when executed, cause a computer to perform a method for converting color data values, comprising:

mapping color data values representing an image in a first device into color data values of a XsRGB color space; and

converting the XsRGB color data values into color data values representing an image in a second device,

wherein the step of mapping includes utilizing multiplication of R_0, G_0, B_0 values by a predetermined matrix, where the R_0, G_0, and B_0 values denote normalized numerically linear red, green and blue components for a color value,

wherein ~~the R_0, G_0, B_0~~ XYZ values are obtained in accordance with the following:

$$\begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix} = M^{-1} \begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix},$$

where $M^{-1} = \begin{bmatrix} n_{XR} & n_{XG} & n_{XB} & u_X \\ n_{YR} & n_{YG} & n_{YB} & u_Y \\ n_{ZR} & n_{ZG} & n_{ZB} & u_Z \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein X, Y, and Z denote 1931 Commission Internationale de l'Eclairage XYZ values where Y has been normalized to 1,

wherein the XYZ values with respect to the D_{65} standard are obtained in accordance with the following:

$$\begin{cases} X_{D65} = x_{D65}/y_{D65} = 0.9502 \\ Y_{D65} = 1.0 \\ Z_{D65} = (1.0 - x_{D65} - y_{D65})/y_{D65} = 1.0887 \end{cases},$$

wherein a transformation matrix from XYZ to the XsRGB color space is obtained in accordance with the following:

$M_w = M_{D65} S_w$,

where $M_{D65} = \begin{bmatrix} 3.2410 & -1.5374 & -0.4986 & 0 \\ -0.9692 & 1.8760 & 0.0416 & 0 \\ 0.0556 & -0.2040 & 1.0570 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

where $S_w = \begin{bmatrix} X_{D65}/X_w & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_{D65}/Z_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein X_w and Z_w denote corresponding X and Z values with respect to a standard illuminans defined by CIE,

wherein the step of converting includes converting from the XsRGB color data values to XYZ values based upon a transverse~~traverse~~ matrix obtained in accordance with the following:

$M_w^{-1} = S_w^{-1} M_{D65}^{-1}$,

where $M_{D65}^{-1} = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 & 0 \\ 0.2126 & 0.7152 & 0.0722 & 0 \\ 0.0193 & 0.1192 & 0.9505 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ and,

where $S_w^{-1} = \begin{bmatrix} X_w/X_{D65} & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & Z_w/Z_{D65} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$,

wherein the color data values representing the image in the second device are obtained in accordance with the following:

$$\begin{pmatrix} R_0 \\ G_0 \\ B_0 \\ 1 \end{pmatrix} = M \begin{pmatrix} X \\ Y \\ Z \\ 1 \end{pmatrix},$$

$$\text{where } M = \begin{bmatrix} m_{RX} & m_{RY} & m_{RZ} & t_R \\ m_{GX} & m_{GY} & m_{GZ} & t_G \\ m_{BX} & m_{BY} & m_{BZ} & t_B \\ 0 & 0 & 0 & 1 \end{bmatrix},$$

wherein *m* denotes a rotational part, *t* denotes a transitional part, *n* denotes an inverse rotational part, and *u* denotes an inverse transitional part.